ABSTRACT

THESIS: Fuel Utilization in Prepubertal Boys vs. Girls During Prolonged Exercise

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This study examined fat and carbohydrate usage in prepubertal boys and girls during prolonged submaximal exercise bout at 50% of VO_2max. It was hypothesized there would be no sex difference in carbohydrate and fat oxidation rates and percentages relative to total energy expenditure during the exercise. Twenty children (8-12 years of age) participated in the study. During the two visits, anthropometric, body composition, information about maturity level, and heart rate data were collected. Pulmonary exchange data for graded exercise test and two 20-minute bouts of cycling were collected using indirect calorimetry. Pulmonary gas exchange was measured at 10 min in bout 1 and 5, 10, 15, and 20 min in bout 2 and used for determination of carbohydrate and fat oxidation rates and percentages. The main results indicated absolute carbohydrate oxidation rate ($mg \cdot min^{-1}$) was significantly higher in boys compared to girls, but differences became negligible when oxidation rate was expressed relative to body weight or fat free mass. Specifically, boys had significantly higher oxidation rates at 10 min in bout 1 and 20 min in bout 2 in comparison to girls. There was no significant difference in percentage of

carbohydrate use between boys and girls. Additionally, there was no significant difference in fat oxidation rate and percentage between boys and girls during the prolonged submaximal exercise. These findings suggest the reliance on carbohydrate sources is increased in prepubertal boys in comparison to girls and could be potentially influenced by increased fat free mass and lower maturity level.